Claims

1. Nuclear fuel rod for a nuclear reactor of the boiling water type, comprising
a cladding tube (2), that defines a closed inner space (3) and which is manufactured from at least one of the materials in the group zirconium and a zirconium-based alloy,
a pile of nuclear fuel pellets (9), arranged in the inner space in the cladding tube so that the nuclear fuel pellets fill part of the inner space (3), and
a fill gas arranged in the closed inner space (3) in order to fill the rest of the inner space,
whereby the fill gas contains a proportion of inert gas and a proportion of carbon monoxide,
characterized in that the internal pressure (P_{fill}) of the fill gas in the nuclear fuel rod amounts to least 2 bar (abs) at room temperature (T_R) and that the proportion of carbon monoxide is at least 3 volume per cent of the fill gas.

2. Nuclear fuel rod according to claim 1, characterized in that the proportion of carbon monoxide constitutes at least 4 volume per cent of the fill gas.

3. Nuclear fuel rod according to claim 2, characterized in that the proportion of carbon monoxide constitutes at least 5 volume per cent of the fill gas.

4. Nuclear fuel rod according to claim 3, characterized in that the proportion of carbon monoxide constitutes at least 6 volume per cent of the fill gas.

5. Nuclear fuel rod for a nuclear reactor of the pressurized water type, comprising
a cladding tube (2), that defines a closed inner space (3) and which is manufactured from at least one of the materials in the group zirconium and a zirconium-based alloy,

a pile of nuclear fuel pellets (9), arranged in the inner space in the cladding tube so that the nuclear fuel pellets fill part of the inner space, and
a fill gas arranged in the closed inner space (3) in order to fill the rest of the inner space,
whereby the fill gas contains a proportion of inert gas and a proportion of carbon monoxide,
characterized in that the internal pressure (P_{fill}) of the fill gas in the nuclear fuel rod amounts to at least 10 bar (abs) at room temperature (T_R) and that the proportion of carbon monoxide is at least 2 volume per cent of the fill gas.

6. Nuclear fuel rod according to claim 5, characterized in that the proportion of carbon monoxide amounts to at least 3 volume per cent of the fill gas.

7. Nuclear fuel rod according to claim 6, characterized in that the proportion of carbon monoxide amounts to at least 4 volume per cent of the fill gas.

8. Nuclear fuel rod according to claim 7, characterized in that the proportion of carbon monoxide amounts to at least 5 volume per cent of the fill gas.

9. Nuclear fuel rod according to any of the preceding claims, characterized in that the cladding tube (2) has an inner surface that faces the inner space (3) and that the material in the cladding tube nearest the inner surface is pre-oxidized and is therefore provided with a surface layer that comprises zirconium oxide.

10. Nuclear fuel rod according to any of the preceding claims, characterized in that the inert gas consists substantially of helium.

11. Nuclear fuel assembly comprising a number of nuclear fuel rods (1) according to any of the preceding claims.

12. Method for manufacturing a nuclear fuel rod for a nuclear reactor of the boiling water type, comprising the steps of:
providing a cladding tube that defines an inner space and that is manufactured from at least one of the materials in the group zirconium and a zirconium-based alloy,
introducing a pile of nuclear fuel pellets, that are arranged in the inner space in the cladding tube so that the nuclear fuel pellets fill part of the inner space, and
filling up the inner space with a fill gas, that contains a proportion of inert gas and a proportion of carbon monoxide, in order to fill the rest of the inner space and concluding the inner space when an internal pressure, that amounts to at least 2 bar (abs) at room temperature (T_R), exists in the inner space ,
whereby the proportion of carbon monoxide is greater than 3 volume per cent of the fill gas.

13. Method for manufacturing a nuclear fuel rod for a nuclear reactor of the pressurized water type, comprising the steps of:
providing a cladding tube that defines an inner space and that is manufactured from at least one of the materials in the group zirconium and a zirconium-based alloy,
introducing a pile of nuclear fuel pellets, that are arranged in the inner space in the cladding tube so that the nuclear fuel pellets fill part of the inner space, and
filling up the inner space with a fill gas, that contains a proportion of inert gas and a proportion of carbon monoxide, in order to fill the rest of the inner space and concluding the inner space when an internal pressure, that amounts to at least 10 bar (abs) at room temperature (T_R), exists in the inner space

whereby the proportion of carbon monoxide is greater than 2 volume per cent of the fill gas.

14. Method according to any of claims 12 and 13, whereby the cladding tube has an inner surface that faces the inner space and whereby the inner surface is provided with a surface layer that comprises zirconium oxide before the nuclear fuel pellets are introduced into the cladding tube.